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THE FLOODLIGHT TRAP

A DEVICE FOR CAPTURING LARGE NUMBERS OF BLACKBIRDS AND STARLINGS AT ROOSTS

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UNITED STATES DEPARTMENT OF THE INTERIOR
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THE FLOODLIGHT TRAP

A DEVICE FOR CAPTURING LARGE NUMBERS OF BLACKBIRDS AND STARLINGS AT ROOSTS

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ABSTRACT

The floodlight trap is described and its development is given. In 101 experimental operations of floodlight traps from January 1957 to April 1962 approximately 672,000 birds were captured (about 414,000 starlings, 135,000 common grackles, 90,000 brown-headed blackbirds, 31,000 red-winged blackbirds, and 1,000 rusty blackbirds); only 10 birds of other species were taken. Catches exceeded 20,000 birds on each of 6 nights and ranged from 80,000 to 120,000 on 3 nights. Operations were generally successful at dense roosts in winter but not at summer roosts. About 60,000 birds were banded and released, of which 650 were recovered at other places; 152 birds banded elsewhere were captured. Some 10,000 captured birds were used for research.

INTRODUCTION

Man generally considers birds desirable. At certain times and places, however, some kinds of birds cause problems. They may severely damage grain, fruit, and truck crops. When they roost in immense numbers, they may kill forest plantations with their droppings. They sometimes collide with aircraft, causing costly damage and loss of human life. They may become both a nuisance and a public health hazard when they congregate in huge flocks and defile and contaminate buildings, sidewalks, playgrounds, and water supplies.

Solutions to problems caused by birds require intensive studies of bird behavior, movements and distribution, nesting and feeding habits, diseases and parasites, physiology, and reaction to various chemical and physical stimuli. Sometimes local damage problems can be solved by capture and removal of the offenders. Thus, both for study and for local removal, it frequently is desirable to catch large numbers of birds, especially red-winged blackbirds (Agelaius phoeniceus), common grackles (Quiscalus quiscula), starlings (Sturnus vulgaris), and brown-headed cowbirds (Molothrus ater), the species that figure prominently in bird depredations. The floodlight trap developed by personnel of the Bureau of Sport Fisheries and Wildlife has proved effective in mass capture of these birds.

DEVELOPMENT OF THE FLOODLIGHT TRAP

In 1955, recoveries of banded red-winged blackbirds and common grackles in the Eastern United States were studied to learn whether they would show the breeding areas and winter locations of birds that damage crops in given areas. The records proved inadequate, mainly because most banding had been done in only a few places and during certain months. Ninety-five percent of the recoveries of redwings in the Atlantic States (exclusive of Florida) were of birds banded from March to August. Seventy percent of the recoveries were of birds banded in Massachusetts. Eleven percent had been banded in New York, and smaller percentages in 18 other States or Provinces. Most recoveries were from places where shooting was prevalent, and most banding was done where there were many banders. The data also revealed that only 0.2 percent of the banded red-winged blackbirds were retaken away from locations where banded.

The need for a planned program of blackbird banding was apparent. Larger samples were needed at selected locations and at appropriate seasons. Data were needed especially for the period September to February. Too few birds could be caught by known methods. Mist netting, trapping with small ground traps, and catching birds by hand in the dark at roosts were inadequate for capturing birds in large numbers.

The idea of the light trap was first explored in January 1957. The literature held many accounts indicating that nocturnally migrating birds were attracted to ceilometers and lighted structures (Allen 1880; Howell, Laskey, and Tanner 1954; Howell 1955; Laskey 1956; and Tordoff and Mengel 1956). Following this lead, a team of investigators took six 1,000-watt floodlights to the edge of a starling and blackbird roost at the Olmsted Air Force Base near Harrisburg, Pa. The lights were directed into the flock. The immediate result was that most of the birds within 150 feet fluttered out of the range of the lights. The investigators next walked among the roosting birds in the dark part of the roost. With this disturbance, the birds flew into the lighted zone, landing on trees and brush in front of the lights. As the investigators emerged from the darkness and continued the disturbance, the birds flushed toward the lights. Thus, the floodlight trap was conceived.

DESCRIPTION AND OPERATION OF THE FLOODLIGHT TRAP

A good floodlight trap must have certain qualities: portability so it can be moved frequently, strength to withstand the weight and battering of thousands of birds at one time, and durability to withstand high winds and general weathering. Furthermore, there must be the means for keeping birds alive for banding or for use in other research, and for killing birds expediently when necessary. The trap described here meets most of these requirements.

Essentially, a floodlight trap is a large funnel of netting supported by a framework; the mouth of the funnel is placed as close as possible to the edge of a roost, and the throat of the funnel is connected to a large holding chamber. Floodlights behind the holding chamber are directed toward the roost. The most satisfactory holding chamber is a tent with curtains in the front and rear that can be closed quickly by zippers. When a tent is used, the floodlights are set within the tent. The trap is set up in daylight; when it becomes dark, several men encircle the roost and flush birds by making a disturbance. The birds then are herded toward the light. At the end of the drive, the birds are enclosed in the holding chamber.

Birds can be killed humanely by gassing with hydrogen sulphide. They can be kept alive in gathering cages placed end to end at a rear corner of the tent. The number of birds entering each gathering cage can be regulated by sliding doors on the ends of the cages. Birds are removed from gathering cages through small access doors (see fig. 3).

Floodlight traps have differed somewhat in shape and size when used at different roosts. The net of the largest floodlight trap used by personnel of the Patuxent Wildlife Research Center is 250 feet across the front, 30 feet across the rear, and 90 feet deep. The tent is 40 feet long, 11 feet wide, and 5½ to 8 feet high. The net is supported by prefabricated towers 50 feet high. Five 1,000-watt floodlights are operated in the tent, with the power supplied by a 7.5-kilowatt generator. The material for this trap cost about $2,700 with galvanized steel towers and $3,700 with aluminum towers.

This large trap has been used at roosts where trees were 30 to 40 feet high, and where large catches were desired. Smaller, less expensive traps are satisfactory and more convenient to use at roosts where the vegetation is lower or fewer birds are wanted.

Specifications for equipment and directions for assembling and operating a floodlight trap can be obtained from the Bureau of Sport Fisheries and Wildlife, Branch of Wildlife Research, Washington, D. C. 20240.

FACTORS AFFECTING THE SUCCESS OF THE FLOODLIGHT TRAP

Successful trapping depends on many factors besides the structure of the trap. The weather, the size and position of the roost, bird density, and the management of the drive are all very important. Dark, cloudy, calm, cold nights are best. Birds can be driven toward the trap most easily when the roost is in a small area isolated from other favorable roost cover, and where the ground slopes upward to the trap site. Trapping also is most successful when bird densities are high. Proper management of a drive requires that the participants keep in touch with each other and so coordinate their efforts. This is most effective when vegetation is sparse enough to be easily penetrated. Trapping can be successful regardless of adverse weather or other unfavorable conditions when the trap can be placed immediately higher than the vegetation and immediately beside a very dense concentration of birds. The birds can then be taken by surprise in a short, quick drive.

Floodlight trapping has been unsuccessful at summer roosts for reasons that are not altogether clear. It may be that the birds are more active on warm nights and therefore more difficult to capture. It seems more likely, however, that they do not roost in such compact masses in summer, being less gregarious at that time.

RESULTS

Approximately 672,000 birds were caught at 18 roosts in 101 operations between January 1957 and April 1962 (see table 1). The catch included 414,000 starlings, 135,000 common grackles, 90,000 brown-headed cowbirds, 31,000 red-winged blackbirds, and 1,000 rusty blackbirds (Euphagus carolinus). Only 10 birds of other species were captured: 7 robins (Turdus migratorius), 2 cardinals (Richmondena cardinalis), and 1 house sparrow (Passer domesticus). Catches exceeded 10,000 birds on 9 nights, all in January and February. These peak catches were made at roosts in four different States-- Alabama, Arkansas, Illinois, and Pennsylvania. The greatest catch in a single night was 120,000 birds at Walnut Ridge, Ark., on January 20, 1961. Catches exceeded 20,000 birds on each of 6 nights. They ranged from 80,000 to 120,000 on 3 nights, from 5,000 to 10,000 on 17 nights, and from 1,000 to 5,000 on 45 nights. Fewer than 30 birds were taken on 9 nights, and none were taken on 4 nights. Many of the poor catches were made when the trap was being demonstrated or when it was being operated experimentally to determine the effects of different trap configurations, weather conditions, or roost situations.

Starlings were more readily trapped than the other species. Red-winged blackbirds were less susceptible, but when they made up a fairly high proportion of the birds in the roost and other conditions were favorable, adequate numbers were caught. For example, more than 6,000 red-winged blackbirds were taken in nine operations in Arkansas in March 1962, even though catches were intentionally limited to numbers that could be efficiently handled by a 2-man banding crew.

ROLE OF THE FLOODLIGHT TRAP IN BANDING

Almost 60,000 birds were banded and released during floodlight trapping from January 1957 to April 1962. By December 1962, 647 (1.09 percent) of these had been reported at locations other than the roost where they were banded. These records are shown in

Table 1.--Birds captured with the floodlight trap at 18 roosts, January 1957 - April 1962

Location	Date	Number of operations	Number of birds caught						
			Starling	Common grackle	Brown-headed cowbird	Red-winged blackbird	Rusty blackbird	Other	Total
Auburn, Ala.	1/25-29/62	4	6,505	733	1,650	152	408	0	9,448
Montgomery, Ala.	1/20-23/60	3	22,224	1,457	13,178	1,291	136	2	38,288
Forrest City, Ark.	3/1-11/62	9	2,423	5,670	1,398	6,410	237	0	16,138
Walnut Ridge, Ark.	1/18-20/61	2	133,439	42,689	2,845	20,246	427	0	199,646
Leipsic, Del.	8/21/57	1	0	0	0	1	0	0	1
Port Penn, Del.	9/6-11/57	2	6	10	50	62	0	0	128
Springfield, Ill.	2/26-3/1/60	3	62,632	155	251	0	2	0	63,000
W. Baton Rouge, La.	1/3-12/62	8	9,845	5,202	1,451	1,233	46	6	17,783
Bowie, Md.	7/19-24/61	2	358	42	12	0	0	0	412
Chesapeake City, Md.	10/30-31/57 11/20-12/9/58	7	2,049	249	404	35	1	0	2,738
Pond Neck, Md.	10/11-27/60	4	2,247	118	679	52	2	0	3,098
South Mills, N. C.	2/8-14/61	4	2	27	0	5	0	0	34
Bellefonte, Pa.	4/4/61	1	250	5	0	0	0	0	255
Hanover, Pa.	12/15/58-3/31/59 2/5-4/7/60 3/14-16/61 12/13/61-4/4/62	38	145,092	71,164	64,405	323	79	1	281,064
Olmsted AFB, Pa.	1/23-2/7/57	6	11,990	388	369	0	0	0	12,747
Clemson, S. C.	2/1-5/62	4	8,605	5,293	1,069	784	13	1	15,765
Berryville, Va.	8/26/59	1	2	0	0	0	0	0	2
Bolivar, W. Va.	9/27-28/59	2	6,493	2,250	2,114	222	0	0	11,079
TOTAL		101	414,162	135,412	89,875	30,816	1,351	10	671,626

table 2 for birds from roosts where more than 1,000 birds were banded. Overall recovery of starlings was highest (1.74 percent). Other species recovered were: common grackles (1.01 percent), cowbirds (0.26 percent), and red-winged blackbirds (0.14 percent). These recoveries are based on all birds banded, so the time for recovery has been short for many. Recoveries of birds banded from 2-3/4 to 6 years before December 1962 are shown as subtotals in table 2. These recoveries (starlings, 2.03 percent; common grackles, 1.64 percent; cowbirds, 0.46 percent) are considerably higher than the overall recoveries, but they may approximate the final expected recoveries for these species. Only 2 of 414 red-winged blackbirds were recovered, so the computed 0.48 percent may not be a reliable indicator for this species.

Recoveries reported by the end of 1962 from bandings at Hanover, Pa., showed that the percent of recovery after a lapse of 4 years from the time of banding was not much higher than the percent obtained after 3 years; starling recovery increased from 1.75 to 1.83 percent and grackle recovery from 1.63 to 1.83. The recoveries of cowbirds increased from 0.48 to 0.63 percent, but these figures are based on only eight recoveries. These data indicate that by a lapse of 3 years most recoveries had been made.

In addition to the 101 floodlight trap operations conducted by personnel of the Patuxent Wildlife Research Center and recorded in table 1, personnel of the Alabama and Louisiana Cooperative Wildlife Research Units operated floodlight traps at local roosts in January and February 1963. In 13 operations in Alabama, about 19,000 birds were caught and 13,000 were banded. In 16 operations in Louisiana, about 25,000 birds were caught and almost 19,000 were banded. Cowbirds were commonest in the catches, but 22,000 redwings were caught at Baton Rouge and 1,030 at Auburn. Thus, although much greater numbers of blackbirds are being banded than ever before, it is not yet certain how much effort is needed to produce sufficient information for understanding damage problems. Some examples of the effectiveness of local banding efforts are shown in table 3. The proportion of banded birds taken at different roosts varied greatly. For example, at Clemson, S. C., 1 banded starling was recovered to every 3,000 captured, and at Hanover, Pa., 1 was recovered to every 5,000 captured. In contrast, recoveries were much scarcer at Montgomery, Ala. (1:22,000), Springfield, Ill. (1:63,000), and Walnut Ridge, Ark. (1:133,000). Cowbird recoveries varied similarly: recovery rates at Hanover (1:800) and Clemson (1:1,000) were conspicuously higher than at Montgomery (1:13,000) and Walnut Ridge (0:2,900). The capture of larger percentages of banded birds at eastern seaboard localities than in the Midwest suggests that a greater proportion of the eastern population may have been banded.

Table 2.--Reports by December 1962 of birds banded at roosts from January 1957 to April 1962
(Roosts where less than 1,000 birds were banded are not included)
(Birds reported from roost where banded are not included)

Roost location	Year of banding	Starling			Common grackle			Cowbird			Redwing. blackbird			Rusty blackbird			Total		
		Number banded	Number reported	Percent reported	Number banded	Number reported	Percent reported	Number banded	Number reported	Percent reported	Number banded	Number reported	Percent reported	Number banded	Number reported	Percent reported	Number banded	Number reported	Percent reported
Olmsted AFB, Pa.	1957	3,970	102	2.57	199	6	3.02	162	0	0.00	0	0	0.00	0	0	0.00	4,331	108	2.49
Chesapeake City, Md.	1957 1958	1,206	31	2.57	176	3	1.70	289	0	0.00	27	0	0.00	1	0	0.00	1,699	34	2.00
Hanover, Pa.	1959	5,040	92	1.83	3,833	70	1.83	1,269	8	0.63	17	0	0.00	7	0	0.00	10,166	170	1.67
Bolivar, W. Va.	1959	1,393	11	0.79	955	6	0.63	100	1	1.00	52	0	0.00	0	0	0.00	2,500	18	0.72
Montgomery, Ala.	1960	1,875	49	2.61	668	11	1.65	386	1	0.26	317	2	0.63	51	0	0.00	3,297	63	1.91
Hanover, Pa.	1960	3,936	69	1.75	2,215	36	1.63	1,238	6	0.48	1	0	0.00	5	0	0.00	7,395	111	1.51
SUBTOTAL	1957-Spring 1960	17,420	354	2.03	8,046	132	1.64	3,444	16	0.46	414	2	0.48	64	0	0.00	29,388	504	1.71
Pond Neck, Md.	Fall 1960	1,072	11	1.02	100	0	0.00	231	0	0.00	43	1	2.33	0	0	0.00	1,446	12	0.83
Walnut Ridge, Ark.	1961	360	7	1.94	1,027	6	0.58	25	0	0.00	212	0	0.00	7	0	0.00	1,631	13	0.80
Hanover, Pa.	1961	961	10	1.04	588	4	0.68	514	2	0.39	4	0	0.00	0	0	0.00	2,067	16	0.77
W. Baton Rouge, La.	1962	1,283	12	0.94	3,216	15	0.46	897	1	0.11	1,001	1	0.01	22	0	0.00	6,419	29	0.45
Auburn, Ala.	1962	1,450	11	0.76	719	6	0.83	1,514	1	0.07	139	0	0.00	306	0	0.00	4,128	18	0.44
Clemson, S. C.	1962	49	1	2.04	2,969	23	0.77	804	1	0.12	412	0	0.00	8	0	0.00	4,242	25	0.59
Hanover, Pa.	1962	620	0	0.00	441	2	0.45	391	0	0.00	5	0	0.00	0	0	0.00	1,457	2	0.14
Forrest City, Ark.	1962	150	1	0.67	3,569	21	0.59	567	1	0.18	4,282	5	0.12	158	0	0.00	8,726	28	0.32
SUBTOTAL	Fall 1960-1962	5,945	53	0.89	12,629	77	0.61	4,943	6	0.12	6,098	7	0.11	501	0	0.00	30,116	143	0.47
TOTAL	1957-1962	23,365	407	1.74	20,675	209	1.01	8,387	22	0.26	6,512	9	0.14	565	0	0.00	59,504	647	1.09

Table 3.--Banded birds taken in floodlight traps, 1957-1962
(No banded red-winged blackbirds or rusty blackbirds were caught.)
(Only those roosts are named where one or more banded birds were taken.)
(All other roosts are included under "all other sites.")

Location	Date	Starling			Grackle			Cowbird			Total		
		Banded birds caught	Total birds caught	Ratio, caught to banded	Banded birds caught	Total birds caught	Ratio, caught to banded	Banded birds caught	Total birds caught	Ratio, caught to banded	Banded birds caught	Total birds caught	Ratio, caught to banded
Auburn, Ala.	1962	0	6,505	-	0	733	-	3	1,650	1:550	3	8,888	1:2,963
Montgomery, Ala.	1960	1	22,224	1:22,224	1	1,457	1:1,457	1	13,178	1:13,178	3	36,859	1:12,286
Walnut Ridge, Ark.	1962	1	133,439	1:133,439	0	42,689	-	0	2,845	-	1	178,973	1:178,973
Springfield, Ill.	1960	1	62,632	1:62,632	0	115	-	0	251	-	1	62,998	1:62,998
W. Baton Rouge, La.	1962	0	9,845	-	1	5,202	1:5,202	0	1,451	-	1	16,498	1:16,498
Chesapeake City, Md.	1957	0	2,049	-	0	249	-	1	404	1:404	1	2,702	1:2,702
Hanover, Pa.	1958-1962	29	145,092	1:5,003	28	71,164	1:2,542	80	64,405	1:805	137	280,661	1:2,049
Clemson, S. C.	1962	3	8,605	1:2,868	0	5,293	-	1	1,069	1:1,069	4	14,967	1:3,742
Bolivar, W. Va.	1959	0	6,493	-	1	2,250	1:2,250	0	2,114	-	1	10,857	1:10,857
All other sites		0	17,278	-	0	6,260	-	0	2,508	-	0	26,046	-
TOTAL		35	414,162	1:11,833	31	135,412	1:4,368	86	89,875	1:1,045	152	639,449	1:4,207

However, such a conclusion is not safe, since an abnormally high number of banded birds could be taken in trapping near a banding station where unusually large numbers of birds have been banded. For example, all three cowbirds taken at Auburn, Ala., were from a sample of 8,275 cowbirds banded in the 1960-61 winter season near Montgomery, Ala., only 50 miles away.

There have been some roost-to-roost recoveries over considerable distances. For example, a starling banded on January 23, 1960, at the roost at Montgomery, Ala., was recovered at the roost at Hanover, Pa., on March 21, 1960. A starling banded on March 29, 1960, at the Hanover roost was recovered at the roost at Clemson, S. C., on February 4, 1962.

ROLE OF THE FLOODLIGHT TRAP IN ACQUIRING BIRDS FOR RESEARCH

Over 10,000 of the birds captured at floodlight traps have been used in research. Many thousands have been examined for both external and internal parasites and for diseases. Other thousands have been used as laboratory subjects for determining the effects of pesticides, avicides, and chemosterilants. Many have been used in behavioral studies. Large samples of birds in some catches were aged to learn the age composition of roosting populations.

ROLE OF THE FLOODLIGHT TRAP IN POPULATION CONTROL

Reducing blackbird numbers is often proposed as a solution to the crop damage problem. Certain outstanding catches made with the floodlight trap have led to overoptimism about the use of this trap for population reduction. A catch of 200,000 birds in 2 nights at Walnut Ridge, Ark., seems large, but it constituted less than 10 percent of the estimated roost population. Some 20 equally successful operations would have been required to reduce that roosting population by two-thirds.

The Walnut Ridge roost site was unusually favorable for floodlight trapping, and such success cannot be expected at most roosts. The roost was a small, deciduous woodlot with sparse undergrowth, surrounded by large cotton fields. The trap was placed adjacent to the roost and spanned most of one edge. The lights of the trap penetrated the roost, allowing the operators who were driving the birds to keep in contact with one another and to observe the activity of the birds, so that the drives were well coordinated.

Because of the high catches at Walnut Ridge, the Arkansas Legislature appropriated funds for the construction and operation of a floodlight trap by a State agency during the following winter. Some 10,000 birds reportedly were taken at one roost.

Personnel in the Branch of Predator and Rodent Control of Region 3 of the Bureau of Sport Fisheries and Wildlife have used the floodlight trap with varying success in attempts to reduce bird populations at different roosts. At Springfield, Ill., 12,000 birds were taken in 1 night subsequent to three operations (shown in table 3) in which 63,000 birds were taken.

At a holly orchard in Oregon, where starlings were roosting, the floodlight trap was used throughout the winter season of 1960-61. Some 46,775 starlings, estimated to be 10 percent of the population, were taken in these operations.

The floodlight trap cannot be used successfully at every roost. Some roosts are inaccessible; others have insufficient open area in which to operate. Some may have almost impenetrable vegetation or be flooded with water, and therefore be unworkable; others may cover a large area through which the birds are spread too thin. When favorable roost cover is extensive, the birds flushed from the roost are apt to bypass the trap and settle down elsewhere.

SUMMARY

The floodlight trap is a device for capturing large numbers of starlings and blackbirds at their night roosts. Basically, it is a large funnel of netting that tapers back to a tent containing bright lights. The trap is operated at night by several men, who encircle the roost, flush the birds, and herd them toward the trap.

On 101 nights of experimental floodlight trapping by personnel of the Patuxent Wildlife Research Center, approximately 672,000 birds were captured. These included 414,000 starlings, 135,000 common grackles, 90,000 brown-headed cowbirds, 31,000 red-winged blackbirds, and 1,000 rusty blackbirds. Catches exceeded 10,000 birds on each of 9 of the nights, all in January and February. These high catches were made at roosts in four States-- Alabama, Arkansas, Illinois, and Pennsylvania. On each of 6 nights catches exceeded 20,000, and on 3 nights catches ranged from 80,000 to 120,000.

Although some outstanding catches have been made at certain roosts, the floodlight trap is of only limited value in reducing blackbird and starling populations. Even large numbers of birds captured may be a very small proportion of a roost population. Furthermore, the physical features of certain roosts preclude floodlight trapping. Weather, too, is very important to success, so large catches cannot be made at will.

The floodlight traps invariably took starlings in greater relative proportions than other species. Species other than blackbirds and starlings were rarely taken-- only 10 in the total of 672,000 birds.

Over 10,000 of the birds taken in floodlight trapping have been used in research. Some have been examined for diseases and parasites; others have been used in experimentation on the effects of pesticides, avicides, and chemosterilants; in studies of behavior; and in determinations of the age and sex composition of roosting populations.

As of December 1962, 650 (1.1 percent) of the 60,000 birds that were banded have been recovered at locations other than the roost where banded. Also, 152 other birds banded elsewhere were taken in floodlight trap operations. These records contribute information on migration and movements that is important in understanding damage problems.

Efforts to improve the floodlight trap are being continued. These involve varying the structure and lighting system and improving operational methods. The objective is to adapt the trap for better use in different roost situations and to improve its usefulness in taking and holding limited numbers of birds of certain species for banding or other research, or for disposal where this is necessary.

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Figure 1. Floodlight trap used for capturing and banding blackbirds at a roost in bamboo thicket near Clemson, S. C.

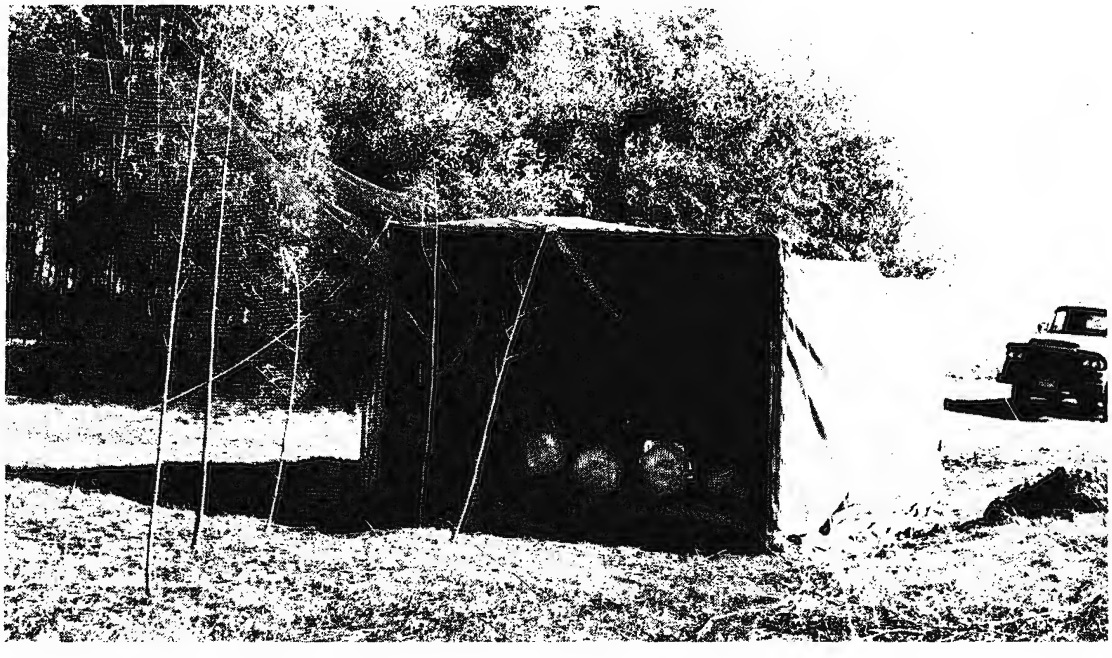

Figure 2. Tent of the floodlight trap. Light area in the lower left corner behind one of the floodlights is the exit to gathering cages.

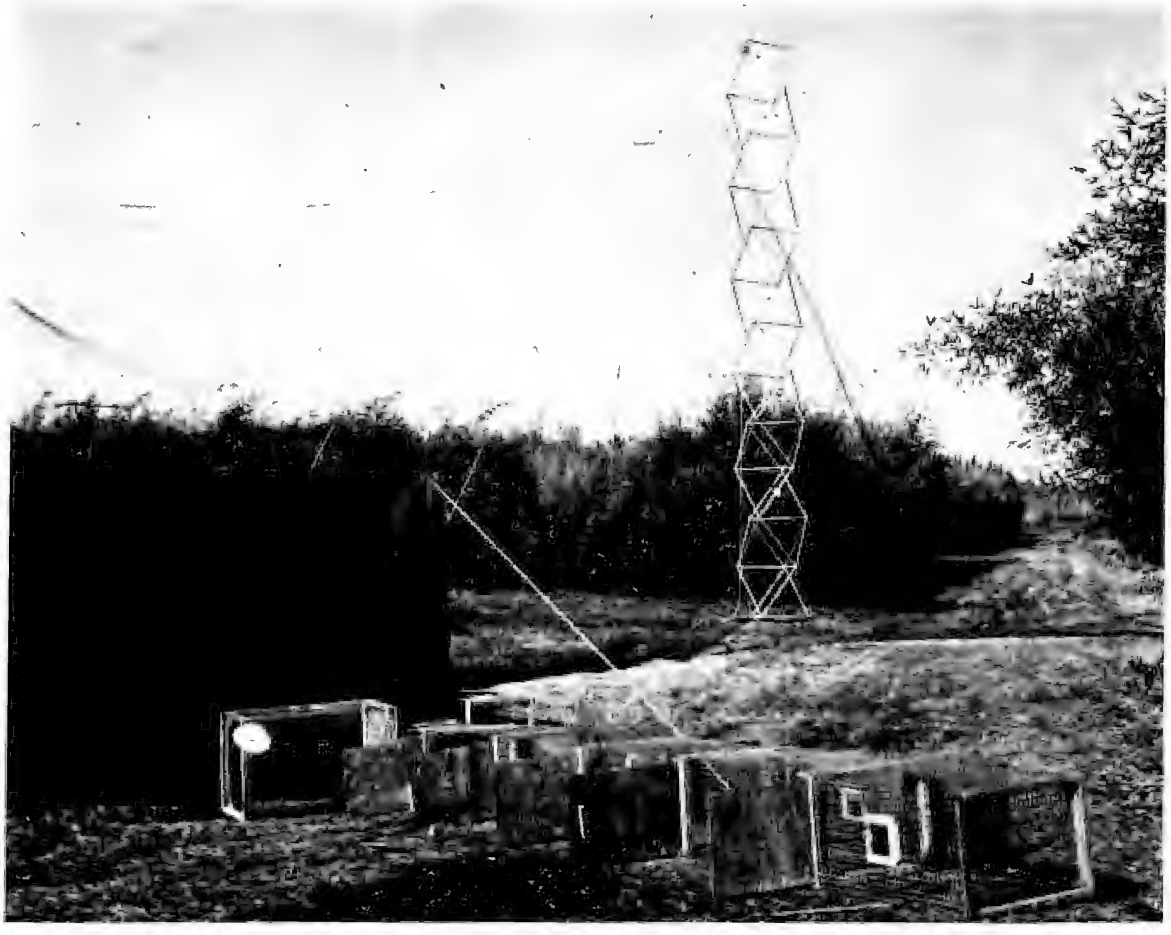

Figure 3. Gathering cages with sliding doors arranged at a corner of the tent for the removal of birds.

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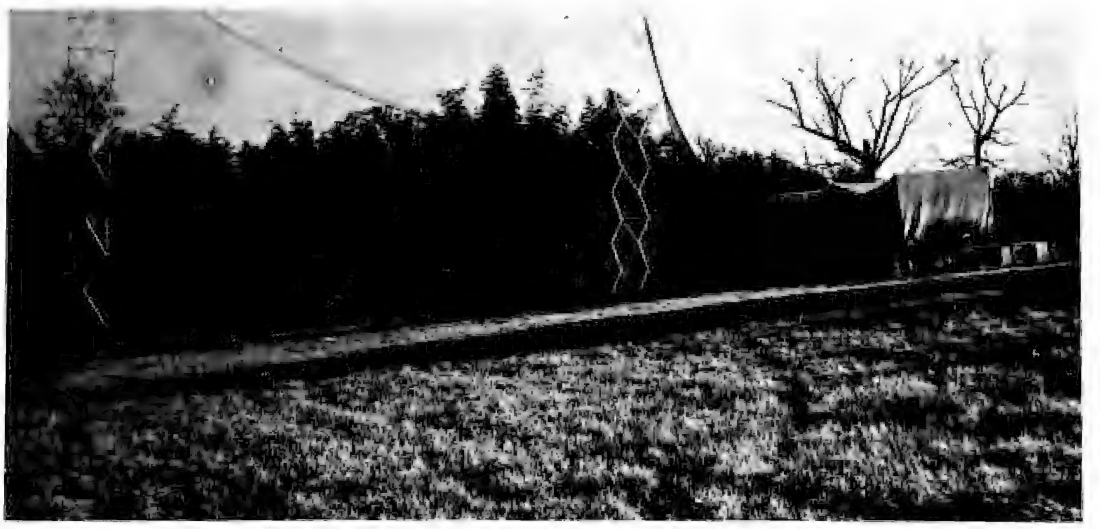

ASSEMBLY AND OPERATION OF THE FLOODLIGHT TRAP*

by

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INTRODUCTION

A floodlight trap is a device for capturing large numbers of starlings and blackbirds at winter roosts. Essentially, it is a large funnel of netting with the mouth placed as close as possible to the edge of a roost and the throat connected to a large holding chamber. Floodlights are directed toward the roost from within the holding chamber. The trap is set up in daylight; at night men encircle the roost, flush birds by making a disturbance, and herd them toward the lights and into the holding chamber.

In the design of a satisfactory trap, certain characteristics must be considered: portability and ease of assembly; strength to hold the weight of the net in wind and storm and to withstand the weight and battering of thousands of birds being taken at one time; and weather resistance, since the trap may be exposed for a long time in the field. Means must be provided for keeping trapped birds alive and in good condition if they are to be used for banding or other research, or for killing the birds expediently if they are being caught to reduce their numbers.

*Supplement to Special Scientific Report: Wildlife No. 77

The most satisfactory structure of a floodlight trap depends upon whether it is to be used for catching a limited number of birds for banding, or for catching as many birds as possible. Trap configuration also is determined by the nature of the roost where it will be used. This leaflet describes various trap materials that could be used.

Information on the development and experimental use of the floodlight trap is given in Special Scientific Report: Wildlife No. 77, which is available from the U. S. Department of the Interior, Fish and Wildlife Service, Office of Information, Washington, D. C. 20240. Data are presented on the size and composition of trap catches at different locations. The usefulness of the trap in banding programs, for obtaining specimens for research, and for local population reduction at certain especially favorable locations is pointed out.

EQUIPMENT

SUPPORTS - The net should be held at least 10 feet higher than the roost vegetation. Sometimes suitable trees can be found along the edge of a roost, but usually supports like those mentioned below are needed.

Octahedron towers (Fig. 1) are the best prefabricated supports. Each 3-foot aluminum section weighs about 7 pounds. Seventeen disassembled sections, enough for a 51-foot tower, can be telescoped for storage and transportation into a 7½-foot stack-- a 2-man load. Sections are fastened together with three bolts; no nuts are required. The towers are easy to build in erect position and are relatively safe to climb (inside of struts). One 51-foot tower costs about $525 including guys (wire or strong rope), and a piece of marine plywood 3 x 3 feet by 3/4 inch, which serves as a base plate.

Trylon towers (Fig. 3) are galvanized steel in 10-foot sections weighing about 47 pounds each. These towers are quite satisfactory but they are more difficult to assemble and erect, more cumbersome and bulky to transport and store, and more dangerous to climb (outside of struts) than Octahedron towers. One 50-foot tower costs about $200, including guy cables, top and base plates, and other necessary hardware, such as turnbuckles and anchors.

Telescoping TV masts if securely guyed are adequate when supports 20 to 25 feet are needed. They cost about $15 each, including a metal base and guy wires.

Utility poles can be used very satisfactorily at roosts when the trap is to be operated repeatedly at only one site.

NET - Netting can be cotton or nylon. The nylon is stronger and longer lasting. One-inch square mesh nylon of No. 9 thread costs about 9 cents per square foot compared to about 7 cents for cotton. A nylon net (150 x 30 x 60 feet) of that mesh and thread and treated for mildew resistance, was obtained for $525 in 1960.

A trapezoidal piece of netting (Fig. 2) can be formed into a satisfactory funnel. The front edge should be wide enough to span the supports and extend outward to the ground. The rear of the net should be wide enough to produce some slack at the ground when fitted around the entrance of the holding chamber to keep incoming birds from escaping beneath the netting. The net should be deep enough to slope back to the holding chamber at no more than a 45 degree angle. With too steep a pitch, birds in the funnel will follow the netting upward and escape through the front.

A 3/16-inch nylon rope edging makes the net much stronger and more durable. Nylon rope "ribs" extending from the points of attachment of the pulley ropes on the front edge of the net to the points on the rear edge that connect with the corners of a supporting arch, and another rope rib down the center from front to rear add strength to the net and serve as convenient markers when forming the funnel. Cringles at places shown in Figure 2 are also helpful in spreading and arranging the net.

The net is raised and lowered by using pulleys at the top of the supports. The pulleys, with the ropes threaded through them, should be fastened to the supports before they are raised.

The arch supporting the rear of the net can be wooden, but a framework of pipe, as described below for supporting a canvas holding chamber, is more satisfactory. The arch should be slightly larger than the front arch of the holding chamber for fitting snugly around it (Fig. 4). It must be securely guyed toward the rear to keep the net tightly stretched when in use.

HOLDING CHAMBER - A canvas tent makes the best holding chamber. The tent should be from 20 to 40 feet long, depending upon whether the expected catch is a few thousand or many thousand birds. It should be about 7 feet high at the front and from 8 to 12 feet wide. Five floodlights can be placed side by side in a tent 11 feet wide.

If the birds are to be gassed, a rectangular chamber is satisfactory and heavy canvas would better confine the gas. If the birds are to be driven into gathering cages behind the tent, the tent should be tapered toward the rear to facilitate this operation, and lighter canvas would be more pliable and convenient to handle.

A holding chamber can be formed by arranging canvas over a wooden frame, but a tailor-made tent (Fig. 5), supported by a framework of 1-inch galvanized pipe, is more efficient. In this assembly, the top pieces of pipe are inserted through the hems at the front and rear on the top of the tent. The upright pieces of pipe are then inserted

through the hems on the sides of the tent, and elbows are used to connect the side and top pipes, thus forming the arches. The assembled front arch is fitted inside the arch to which the net has been attached (Fig. 4), and the rear arch is pulled back to stretch the tent. The arches are then secured by guys tied to the elbows. Similar guyed arches should be used inside the tent for added support. Ties stitched to the inside of the tent and secured to the arches reduce billowing of the top and sides of the tent.

A curtain with double-grip zippers for operating from the outside and inside provides a quick and tight way of closing the tent (Fig. 5). The curtain can be held open neatly by being rolled around a rod inserted in the hem and the roll held by ties stitched to the inside and outside surfaces of the front of the tent above the curtain. Bow knots in these ties will let the rolled curtain be dropped quickly. A similar zippered curtain should be at the rear of the tent when the catch is to be collected in gathering cages.

The major cost of a tent is tailoring. The material alone for a tent 20 feet deep and 11 feet wide can be obtained for less than $25.00.

A simple holding chamber also may be made of 1-inch mesh poultry wire, but wire has disadvantages. Birds cannot be gassed in a wire cage, birds are more difficult to catch for banding, and the desired lighting effects are harder to achieve.

LIGHTING - Specific lighting requirements are not standardized. Both good and poor catches have been obtained using either three or five 1,000-watt lights. Since birds often collect immediately in front of the lights, sometimes in such large numbers as to interfere with the flow of light toward the roost, at times two sets of lights have been used, one set near the middle and the other at the rear of the tent. Floodlights (Fig. 6) both with plain glass and spreadlight lenses also have been used. The spreadlight lens, which obscures the image of the bulb and spreads the beams, is considered more desirable.

Since power lines are not often on hand, a generator is essential. Most portable generators are noisy and smoky and may interfere with the drive. Extension cords should therefore be used so that a generator can be operated at some distance from the trap (100 feet or more).

GATHERING CAGES - These cages (Fig. 7), 1½ x 2 x 2½ feet and constructed of 1-inch mesh hardware cloth, can be made for about $12.00. They are placed end to end at the rear of the holding cage. With sliding doors on the ends, the number of birds they contain can be regulated. After birds are taken from them through the small hinged door, others can be collected from the holding chamber by again arranging the cages end to end with the sliding doors open and then harassing the birds in the chamber. The birds remaining in the cages can be conveniently killed, if so desired, by covering a cage or two with canvas and exposing the birds to exhaust from a gas engine. Exhaust gas, however, has not been satisfactory for killing birds in a large tent.

LETHAL GAS - Gassing in the tent is done by arranging a long section of welding hose around the inside of the top of the tent and introducing gas from a tank of compressed hydrogen sulfide located outside the tent. The distribution of gas in the tent is hastened if small holes are drilled into the hose at 1-foot intervals.

SOURCES OF SUPPLY

Some trap equipment can be constructed in a shop or can readily be obtained from local sources. Suppliers of unusual items such as a specially designed net, prefabricated towers, or hydorgen sulfide cylinders are listed here as a convenience to the reader.

Net: A & W Fishing Supply Company, 9 W. Patapsco Avenue, Baltimore, Maryland 21225; Nichols Net and Twine, Route 3, Bend Road, East St. Louis, Illinois.

Octahedron Tower: Up-Right Towers, Berkeley, California.

Trylon Tower: Trylon Incorporated, Elverson, Pennsylvania.

Hydrogen Sulfide: The Matheson Company, Inc., P. O. Box 85, East Rutherford, New Jersey.

Mentioning these companies does not mean they are necessarily the sole suppliers of the given items, nor does it constitute an endorsement of their products.

TRAP OPERATION

Success at floodlight trapping is not dependent alone on trap structure. Weather conditions, nature of the roost, coordination of drives, and density of roosting bird populations are some of the factors that affect success.

Dark, cloudy, calm, cold nights are most favorable. When the surrounding countryside is illuminated by moonlight, reflection from snow, or nearby community lights, birds flushed from a roost are inclined to fly to other favorable cover and bypass the trap. Trapping has been poor when strong winds have been blowing toward the trap, since birds invariably flush into the wind. Floodlight trapping at summer roosts has been generally unsuccessful.

Controlling the flight of birds toward the trap is most efficient where the roost area is small and isolated from other favorable roosting cover, and where the ground slopes upward to the trap. Coordination of drives is best where the vegetation is sparse enough for the drivers to walk through easily, to observe the bird activity, and to communicate with one another as they converge toward the trap. In driving the birds,

mild disturbances such as hand clapping and shouting, which move the birds steadily forward, are preferable to loud blasts of noise which cause the birds to rise in panic.

Some of the unfavorable factors are less important where the trap can be placed immediately beside a very dense concentration of birds and where the net can be considerably higher than the roost cover. Under these conditions the birds can be taken by surprise in a short, quick drive.

When more birds are being taken than the holding chamber will accommodate, the net can be lowered at the end of the drive. An arch in the throat of the funnel would keep part of the net off the ground and form a supplementary holding chamber. If birds are to be held for sorting on the following day, perches such as brush in the holding chamber will keep them in better condition.

NOTICE

In a total capture of 672,000 birds in floodlight trapping, only 10 birds were not starlings or blackbirds (cowbirds, common grackles, red-winged blackbirds, rusty blackbirds). Starlings are not protected by Federal law, and contrary to popular opinion, a Federal permit is not required to kill red-winged and rusty blackbirds, cowbirds, or grackles when such birds are in the act of or about to commit serious damage to ornamental or shade trees or agricultural crops. Nevertheless, the local game warden should be consulted before a floodlight trap is put into operation.

December 1964

Fig. 1 Octahedron tower.

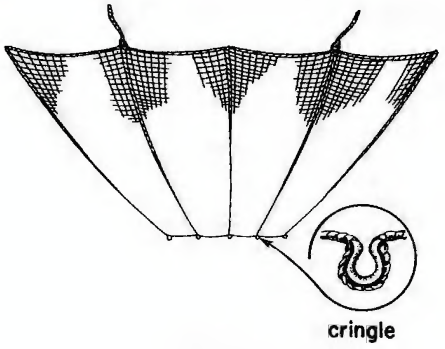

Fig. 2 Net.

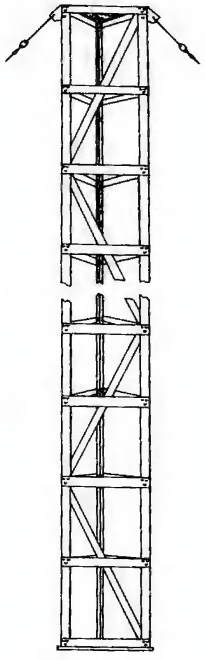

Fig. 3 Trylon tower.

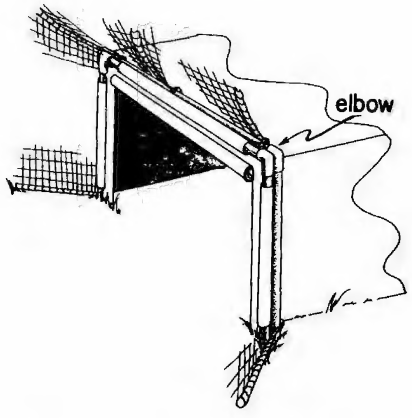

Fig. 4 Junction of net and tent.

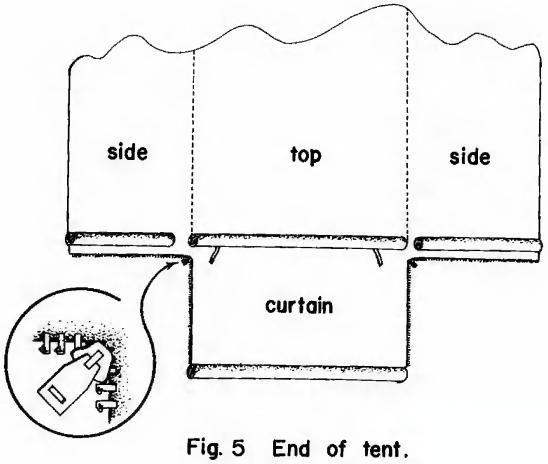

Fig. 5 End of tent.

Fig. 6 Heavy-duty floodlight.

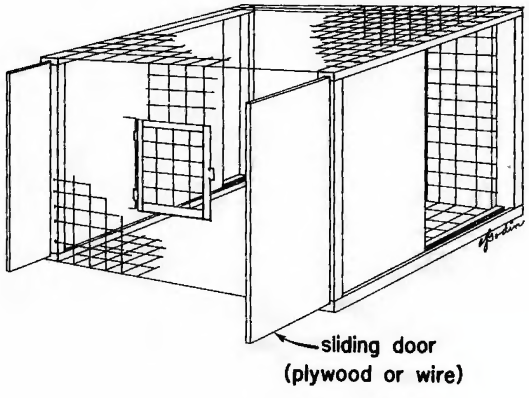

Fig. 7 Gathering cage.

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